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Jameco Part Number 188197

AMPSS®
Astec Modular Power Supply System

Industry Standard Pinout Series

DC-DC Converter Module
Product Requirement Specification
AK60C

Preliminary

Checked Date	Approved Date
ELECTRICAL ENGINEERING - MANAGER	ENGINEERING - MANAGER

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Industry Standard Pin Out Series DC-DC Converters

Introduction

The Industry Standard pin out series is to be an isolated, single output DC to DC converter module, providing up to 100W output. The Industry Standard pin out series features full safety isolated low voltage primary side control and a baseplate operating temperature of up to 100°C.

Key Requirements

- High Efficiency - (TBA or 85%min) @ 5V
- -40°C to 100°C baseplate operating temperature (no derating).
- Low output ripple and noise (150mV max on 5V)
- High capacitive load limit on start-up
- Remote Sense Compensation
- Reliability - 2.5 million hours MTBF min.
- Regulation to zero load
- Fixed frequency switching (500KHz)
- Output Voltage Adjust 90 -110% of nominal
- Enable
- Case pin

Safety Requirements

The modules will be safety approved to the following standards :

UL:	UL1950
CSA:	CSA22.2-234
	CSA22.2-950
VDE:	VDE 0805
	EN60950
CE:	CE Mark
JET & KTL	

Bellcore Specifications-

DC-DC converters should conform to the standards pertaining to power supplies contained in the Bellcore Telecommunication specifications.

Related Products

FLTR100V10 and FLTR100V20 EMI filter.

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Product Range

Model Number	INPUT VOLTAGE (V)	OUTPUT VOLTAGE (V)	OUTPUT POWER (W)
AK60C-048L-022F20G	48	2.2	100W (20A)
AK60C-048L-033F20G	48	3.3	100W (20A)
AK60C-048L-050F20G	48	5	100W (20A)
AK60C-048L-120F08G	48	12	100W (8A)
AK60C-048L-240F04G	48	24	100W (4A)

Total Number of Modules=	5

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Electrical Specifications

Absolute Maximum Ratings – all models

These ratings are intended as guidelines for absolute worst case operating conditions and are not to be interpreted as recommended operating condition

General	48VInput
Continuous Input Voltage	75V
Input Surge Voltage (1 sec)	TBA
Isolation, Input to Output	2100VDC
Isolation Input to Baseplate	1500VDC
Isolation, Output to Baseplate	500VDC
Operating Temperature (Baseplate)	-40 to 100°C
Start-up Temperature	-55C min
Storage Temperature	-55 to 105°C
Operating Relative Humidity (non-condensing)	10% to 95%
Storage Relative Humidity (non-condensing)	95% Max
Altitude (Operating)	< 3000m
Altitude (Storage)	< 9000m
Lead Temperature (soldering 5 Seconds)	235°C

Secondary Control Pins	
+SENSE	V_o - 0.5 to V_o + 0.5 VDC
-SENSE	-0.5 to 0.5 VDC
V ADJ	-0.5 to 7 VDC
ENABLE	0 to 20 VDC

Note : V_o = module output voltage

Specifications

Electrical characteristics to be guaranteed over the full baseplate temperature range (-40 to 100°C) and for the full range of input voltage (V_I) and for the full load range (0 to I_O rated). Except where indicated , +SENSE and -SENSE to be connected to the output terminals at the point of measurement, Module is enabled. All other pins are left floating.

Definitions

V_I, V_O and I_O are actual operating conditions, V_{Inom}, V_{Onom} and I_{Orated} are nominal ratings.

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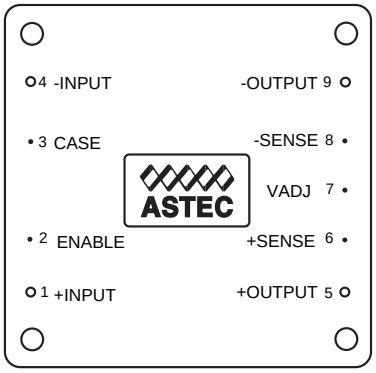
Pin Connections



INPUT/OUTPUT/CONTROL PINS

Pin No	Pin Name	Type	Description
1	+ INPUT	Input	Power input - positive
2	ENABLE	Input	Enables or disables the output of the module
3	CASE		
4	- INPUT	Input	Power input - negative
5	+ OUTPUT	Output	Power output - positive
6	+ SENSE	Input	Used for remote sense function to compensate for load bus resistance
7	V ADJ	Input	Used to adjust module output voltage
8	- SENSE	Input	Used for remote sense function to compensate for load bus resistance
9	- OUTPUT	Output	Power output - negative

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CONTROL SIGNALS

Parameter	Conditions	Parameter	Min	Typ	Max	Units
V ADJ - voltage adjust	Adjust using external resistor	V_O	90		110	$\%V_{Onom}$
ENABLE - module enable (Signal reference to -input)	Module enabled	V_{ENABLE}	0		0.8	V
	V_{ENABLE} = 0.8V	ENABLE current source		400	500	µA

Insulation - all models

INSULATION

Parameter	Conditions	Min	Typ	Max	Units
Input-output insulation resistance	500VDC	10			MΩ
Input-baseplate insulation resistance	500VDC	10			MΩ
Output-baseplate insulation resistance	500VDC	10			MΩ

Transient Response - all models

TRANSIENT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Turn-on time	V_I = 0 to V_{Inom}		1	10	msec
Transient response (25% to 75% load change @ 0.1A/µS, recovery to 1% V_O)	Step-load excursion				
	2.2V output		TBA	200	mV
	3.3V output		TBA	200	mV
	All other models		TBA	10	$\%V_o$
	Step-load response			500	µS

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Electrical Specifications

INPUT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Input voltage		36	48	75	V
Input low line power on voltage	Module power on	31		35.2	V
Input low line power off voltage	Module shutdown	26.6		31.4	v
No load input power	$V_I = V_{Inom}$			2	W
Input capacitance				5	µF

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Nominal (factory set) output voltage			2.2 3.3 5.0 12.0 24.0		V V V V V
Output voltage set point accuracy	T_C = +25°C, $V_I = V_{Inom}$, $I_O = I_{Orated}$	-1		1	$\%V_{Onom}$
Remote sense compensation	$V_I = V_{Imin}$			0.5	V
Output voltage adjust		90		110	$\%V_{Onom}$
Nominal (factory set) output overvoltage protection trip point	All modules except 2.2V 3.3V	120 150 130	130 160 140	140 170 150	$\%V_{Onom}$
Line regulation	V_{Imin} to V_{Imax} , all modules except 2.2V, 3.3V			0.2 10	$\%V_{Onom}$ mV
Load regulation	I_{Omin} to I_{Omax} , all modules except 2.2V, 3.3V			0.2 10	$\%V_{Onom}$ mV
Noise and ripple (Differential)	20Mhz bandwidth All modules except 2.2V, 3.3V			3 150	$\%V_{Onom}$ mV
Noise and ripple (Common mode)	20Mhz bandwidth			0.1	$\%V_{Onom}$
Output Power	See product range table				
Steady State Output current limit	V_O dropped to 90% of V_{Onom}	105	115	125	$\%I_{Omax}$
Short circuit current				170	$\%I_{Omax}$
Temperature coefficient	Per C Baseplate temperature			0.02	$\%V_O$/°C
Overtemperature shutdown		103	110	115	°C
Efficiency	$V_O=V_{Onom}$, $V_I=V_{Inom}$, $I_O=I_{Orated}$ 2.2V output 3.3V output 5V output 12V output 24V output	 TBA TBA TBA TBA TBA	 TBA TBA TBA TBA TBA		 % % % % %

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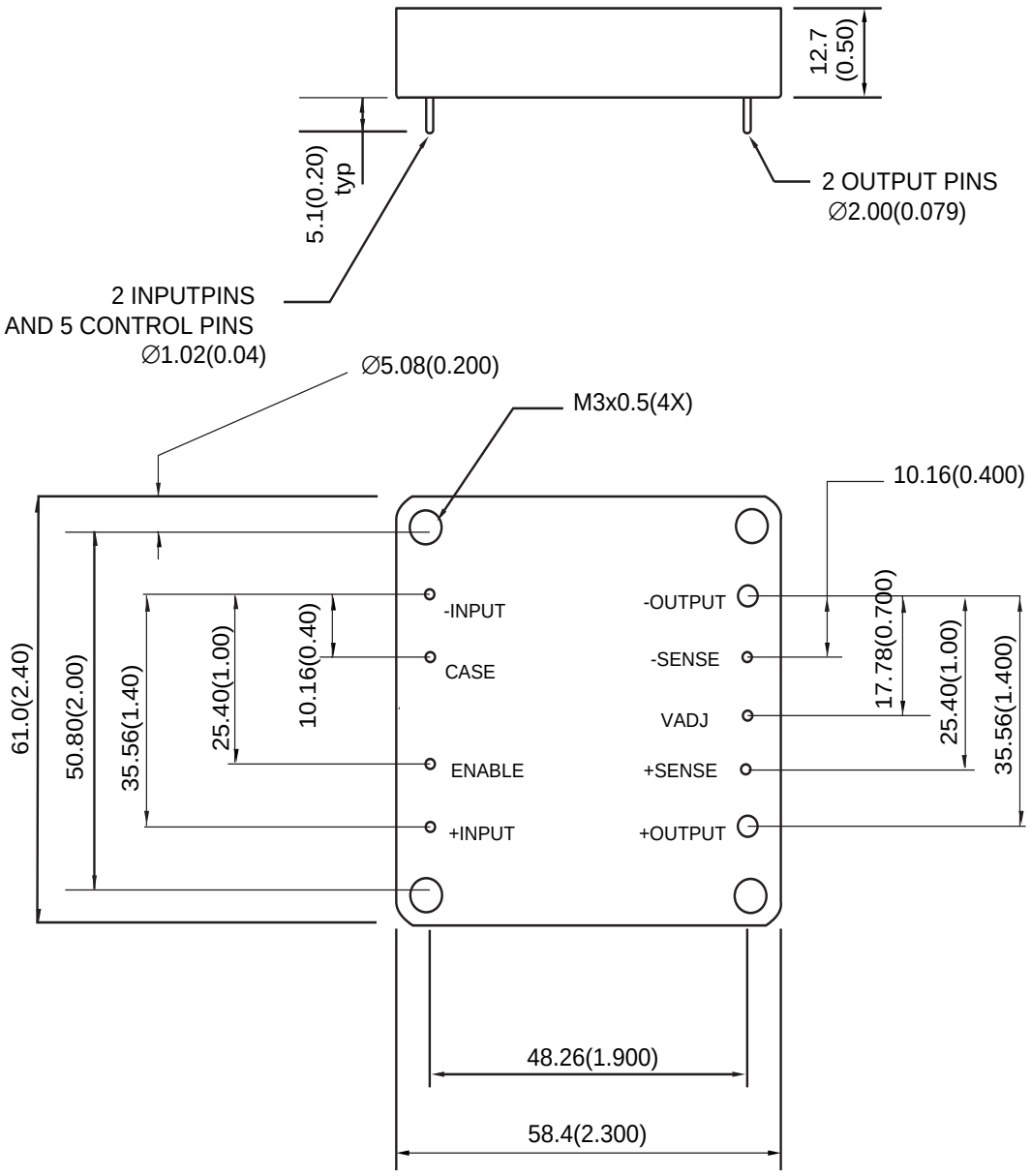
Mechanical Specifications



Notes:
1.All dimensions in mm and (inches)
2.Baseplate must be connected to protective earth
3.General tolerance:.X±0.5(0.02)
.XX±0.25(0.010)

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Mechanical Requirements

1. Vibration - Swept tri-axial sinusoidal vibration per Bellcore TR-NWT-000063 Para 4.4.2
   5Hz - 50Hz 0.5g
   50Hz - 500Hz 3.0g

2. Earthquake - TR-NWT-000063 section 4.5. VERTEQ synthesised earthquake waveform, appears to be random vibration 1-100Hz, max 1.25g, but see the Bellcore spec for full details.

3. Flammability (Bellcore TR-NWT-000062 para 4.3.3.2)
   EITHER Needle flame test - self extinguish within 30 secs and flaming drippings do not ignite paper 2" below module
   OR Oxygen index (per ASTM standard D2863-77) > 28% AND materials used 94V-1 or better.

4. Airborne Contaminants - Must operate for intended service life (20 years for Telecom) in the presence of airborne contaminants (Outdoor Urban contamination levels) per Bellcore TR-NWT-000063 para 4.6.2. May need conformal coating on non-potted modules for this.

5. PIN pull strength Control TBA
   Power TBA

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